

Claims

1. A method of managing time for a controller located in a processing system on a machine, the processing system including a plurality of controllers, each controller having a local clock, and a communication network connecting each of the controllers, including the steps of:

10 establishing an operating characteristic of the machine;

determining whether to update a local time in response to said operating characteristic; and

15 updating said local time using the local clock in response to said update determination.

2. A method, as set forth in claim 1, further comprising the steps of:

20 receiving an official time;

determining a difference between said official time and said local time; and,

determining whether to synchronize said local time with said official time in response to said time difference.

3. A method, as set forth in claim 2, wherein the step of establishing said operating characteristic further comprises the step of receiving an operating characteristic, said operating

characteristic being indicative of the machine being operated.

4. A method, as set forth in claim 2,
5 wherein the step of establishing said operating
characteristic further comprises the step of receiving
an operating characteristic, said operating
characteristic being indicative of the engine being
operated.

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5. A method, as set forth in claim 2,
wherein the step of determining whether to synchronize
said local time further comprises the step of
determining to synchronize said local time with said
15 official time in response to said time difference
being greater than a first threshold.

6. A method, as set forth in claim 5,
further comprising the step of establishing a master
20 controller of the processing system.

7. A method, as set forth in claim 6,
wherein the step of receiving said official time
further comprises the step of receiving said official
25 time from said master controller.

8. A method, as set forth in claim 7,
wherein the step of establishing said operating
characteristic further comprises the step of receiving

an operating characteristic signal from said master controller.

9. A method, as set forth in claim 6,
5 wherein the step of establishing said master controller further comprises the step of participating in an arbitration process among the controllers.

10. A method, as set forth in claim 9,
10 further comprising the step of receiving an arbitration signal.

11. A method, as set forth in claim 10,
generating a priority signal in response to receiving
15 said arbitration signal, said priority signal being indicative of at least one controller characteristic.

12. A method, as set forth in claim 11,
further comprising the steps of:
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receiving at least one priority signal;
determining whether to become the master controller in response to said received at least one priority signal.

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13. A method, as set forth in claim 10,
further comprising the step of initiating said arbitration process in response to receiving power.

14. A method, as set forth in claim 10,
wherein the step of initiating said arbitration
further comprises the step of initiating said
arbitration process in response to failing to receive
5 one of said official time and said operating
characteristic.

15. An apparatus configured to manage time
on a processing system located on a machine,
10 comprising:

a plurality of controllers;
a local clock located on each controller and
configured to establish a local time;
15 a communication network connected to said
controllers; and
wherein each of said plurality of
controllers is configured to establish an operating
characteristic of the machine, determine whether to
20 update said local time, using said local clock, in
response to said operating characteristic, and
updating said local time in response to said update
determination.

25 16. An apparatus, as set forth in claim 15,
wherein said plurality of controllers being further
adapted to establish a master controller in response
to an arbitration process, the remaining controllers
being non-master controllers.

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17. An apparatus, as set forth in claim 16,
wherein each of said non-master controllers receives
an official time signal from said master controller.

5 18. An apparatus, as set forth in claim 17,
wherein each of said non-master controllers is further
adapted to determine a difference between said
official time and said local time and determine
whether to synchronize said local time with said
10 official time in response to said time difference.

19. An apparatus, as set forth in claim 18,
wherein each of said non-master controllers receives
an operating characteristic signal, indicative of said
15 operating characteristic, from said master controller.

20. An apparatus, as set forth in claim 19,
wherein said operating characteristic is indicative of
at least one of a machine operation and an engine
20 operation.

21. An apparatus, as set forth in claim 20,
wherein each of said non-master controllers is further
adapted to synchronize said local time with said
25 official time in response to said difference being
greater than a first threshold.

22. An apparatus, as set forth in claim 21,
wherein at least one of said non-master controllers
30 initiates said arbitration in response to failing to

receive one of said official time signal and said operating characteristic signal.

23. An apparatus, as set forth in claim 22,
5 wherein each said non-master controller generates a priority signal indicative of said controllers capability.

24. An apparatus, as set forth in claim 23,
10 wherein each said non-master controller is further adapted to determine whether to be the master controller in response to receiving said priority signals.

25. A method of managing time for a
15 processing system located on a machine, the processing system including a plurality of controllers, each controller having a local clock, and a communication network connecting each of the controllers, including
20 the steps of:

establishing an operating characteristic of the machine;

determining whether to update a local time
25 on each of the controllers in response to said operating characteristic; and

updating said local time, using the local clock, in response to said update determination.

26. A method, as set forth in claim 25,
further comprising the steps of:

5 establishing an official time;
 determining a difference between said
official time and said local time; and,
 determining whether to synchronize said
local time with said official time in response to said
time difference.

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27. A method, as set forth in claim 26,
further comprising the step of establishing a master
controller, the other controllers being non-master
controllers.

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28. A method, as set forth in claim 27,
wherein the step of establishing said operating
characteristic further comprises the step of
delivering an operating characteristic to each of the
20 non-master controllers, said operating characteristic
being indicative of the machine being operated.

29. A method, as set forth in claim 27,
wherein the step of establishing said operating
25 characteristic further comprises the step of
delivering an operating characteristic signal to each
of the non-master controllers, said operating
characteristic being indicative of the engine being
operated.

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30. A method, as set forth in claim 27,
wherein the step of determining whether to synchronize
said local time further comprises the step of
synchronizing said local time with said official time
5 in response to said time difference being greater than
a first threshold.

31. A method, as set forth in claim 30,
wherein the step of receiving said official time
10 further comprises the step of receiving said official
time from said master controller.

32. A method, as set forth in claim 31,
wherein the step of establishing said operating
15 characteristic further comprises the step of receiving
an operating characteristic signal from said master
controller.

33. A method, as set forth in claim 32,
20 wherein the step of establishing said master
controller further comprises the step of arbitrating
among the controllers.

34. A method, as set forth in claim 33,
25 wherein the step of arbitrating further comprises the
steps of:

at least one of the controllers initiating
said arbitration; and

30 (said at least one controller generating an
arbitration signal in response to said initiation.

35. A method, as set forth in claim 34,
further comprising the step of generating a priority
signal in response to receiving said arbitration
5 signal, said priority signal being indicative of at
least one controller characteristic.

36. A method, as set forth in claim 35,
further comprising the steps of:

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receiving said priority signals;
determining whether to become the master
controller in response to said received priority
signals.

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37. A method, as set forth in claim 36,
wherein the step of initiating said arbitration
further comprises the step of initiating said
arbitration process in response to receiving power.

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38. A method, as set forth in claim 37,
wherein the step of initiating said arbitration
further comprises the step of initiating said
arbitration process in response to failing to receive
25 one of said official time and said operating
characteristic.